CLAIMS

What is claimed is:

1. A power detector for detecting the output of a power amplifier comprising:
a voltage sensor coupled to the power amplifier for sensing the voltage provided to the output of the power amplifier;
a first envelope detector coupled to the voltage sensor;
a current sensor coupled to the power amplifier for sensing the current provided to the output of the power amplifier;
a second envelope detector coupled to the current sensor;
a mixer coupled to first and second envelope detectors for generating an output signal from the sensed voltage and sensed current that is related to the output power of the power amplifier.

2. The power detector of claim 1, wherein the voltage sensor is comprised of a voltage divider coupled to the output of the power amplifier.

3. The power detector of claim 2, wherein the voltage divider is comprised of a plurality of elements having an impedance.

4. The power detector of claim 3, wherein the plurality of elements are capacitors.

5. The power detector of claim 1, wherein the voltage sensor is comprised of a direct connection between the output of the power amplifier and the first envelope detector.

6. The power detector of claim 1, wherein the voltage sensor is formed within the power amplifier.

7. The power detector of claim 6, wherein the power amplifier and voltage sensor are formed on a the same integrated circuit.

8. The power detector of claim 1, wherein the current sensor is comprised of first and second mutually coupled inductors.

9. The power detector of claim 8, wherein the first mutually coupled inductor is connected to the output of the power amplifier, and wherein the current is sensed by sensing the induced current in the second inductor.

10. The power detector of claim 8, wherein the first mutually coupled inductor is comprised of a filter inductor of the power amplifier.

11. The power detector of claim 1, wherein the current sensor is comprised of circuitry that senses a voltage drop across an impedance connected between the output of the power amplifier and a load.

12. The power detector of claim 1, wherein the output signal is based on the magnitudes of the sensed voltage and sensed current.

13. The power detector of claim 1, wherein the mixer is further comprised of:
a first logarithmic amplifier coupled to the voltage sensor;

a second logarithmic amplifier coupled to the current sensor; and

circuitry for combining outputs of the first and second logarithmic amplifiers to generate the output signal.

14. The power detector of claim 13 wherein the first logarithmic amplifier includes a first variable gain amplifier for amplifying the sensed voltage to a desired level, wherein the value of the output of the first logarithmic amplifier is a function of the gain of the variable gain amplifier

15. A method of detecting the output power of a power amplifier comprising the steps of:

sensing the magnitude of the voltage at the output of the power amplifier;

sensing the magnitude of the current at the output of the power amplifier; and

generating a signal using the sensed output voltage and sensed output current, wherein the generated signal is proportional to the output power of the power amplifier.

16. The method of claim 15, wherein the voltage is sensed by connecting a voltage divider to the output of the power amplifier and sensing a voltage present at a node of the voltage sensor.

17. The method of claim 15, wherein the voltage is directly sensed by measuring the voltage present at the output of the power amplifier.

18. The method of claim 15, wherein the current is sensed using first and second mutually coupled inductors.

19. The method of claim 18, wherein the first inductor is a part of the power amplifier, and wherein the current is sensed by sensing the induced current in the second inductor.

20. The method of claim 15, wherein the current is sensed by detecting the voltage drop across an impedance element placed in line with the output of the power amplifier.

21. The method of claim 15, wherein the signal is generated by combining a signal relating to the sensed voltage with a signal relating to the sensed current.

22. The method of claim 21, wherein the signals are combined using a summing element.

23. The method of claim 15, wherein the signal is generated by combining the outputs of a first logarithmic amplifier that amplifies the sensed voltage and a second logarithmic amplifier that amplifies the sensed current.

24. A method of controlling the output power of an RF power amplifier comprising the steps of:

generating a first signal that is proportional to the magnitude of the voltage at the output of the RF power amplifier;

generating a second signal that is proportional to the magnitude of the current at the output of the RF power amplifier;

generating a power control signal based on the first and second signals; and

using the power control signal to control the output power of the RF power amplifier.

1 25. The method of claim 24, wherein the first signal is generated using a voltage
2 sensor coupled to the output of the power amplifier.

1 26. The method of claim 25, wherein the voltage sensor is comprised of a voltage
2 divider.

1 27. The method of claim 24, wherein the second signal is generated using a current
2 sensor coupled to the output of the power amplifier.

1 28. The method of claim 27, wherein the current sensor is comprised of first and
2 second mutually coupled inductors.

1 29. The method of claim 28, wherein the further mutually coupled inductor is a
2 filtering inductor of the power amplifier.

1 30. The method of claim 24, wherein the second signal is generated by detecting the
2 voltage drop across an impedance element connected in line with the output of the power
3 amplifier.

1 31. The method of claim 24, wherein the power control signal is generated by
2 connecting a first logarithmic amplifier to the first signal and a second logarithmic
3 amplifier to the second signal and combining the outputs of the first and second
4 logarithmic amplifiers.

32. A method of detecting the output power of a power amplifier comprising the steps of:

sensing the magnitude of the voltage at the output of the amplifier;

sensing the magnitude of the current at the output of the amplifier; and

determining the output power of the power amplifier based on the sensed magnitude of the voltage and the sensed magnitude of the current.

33. The method of claim 32, wherein the voltage is sensed by connecting a voltage divider to the output of the power amplifier and sensing a voltage present at a node of the voltage sensor.

34. The method of claim 32, wherein the current is sensed using first and second mutually coupled inductors.

35. The method of claim 34, wherein the first inductor is a part of the power amplifier, and wherein the current is sensed by sensing the induced current in the second inductor.

36. The method of claim 32, wherein the current is sensed by detecting the voltage drop across an impedance element placed in line with the output of the power amplifier.

37. The method of claim 32, wherein the output power is determined by combining a signal relating to the sensed voltage with a signal relating to the sensed current.

38. The method of claim 37, wherein the sensed signals are combined using a summing element.

39. The method of claim 32, wherein the output power is determined by combining the outputs of a first logarithmic amplifier that amplifies the sensed voltage and a second logarithmic amplifier that amplifies the sensed current.

40. The method of claim 32, wherein the output power is determined while neglecting any phase information.